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Egypt Seeks New Soviet Missiles

But Israel sees threat of Luna 1 surface-to-surface weapon reduced by Sinai buffer; aircraft, tanks shipped from Alge

By Warren C. Wetmore

Tel Aviv—Expected delivery to the Egyptian army of Soviet Luna 1 surface-to-surface missiles is considered a reduced threat by Israel because of new Sinai buffer zones.

Before the six-day war beginning June 5, the missile, with its 45-55-mi. range, could have carried its 550-lb. warhead from a launch site in the now-occupied Gaza Strip to the outskirts of Tel Aviv. Its accuracy is considered very good, an Israeli official said, with a circular error probability of 2,620 ft.

While this is not likely to cause critical damage, except by accident, without a nuclear warhead, it would suffice as a terror weapon to demoralize the population.

Luna 1 is a member of the Soviet family of unguided missiles bearing the NATO code name Frog. Its cited performance figures, however, indicate that it may be the more advanced Scud missile.

The order to deploy the solid-fueled Luna 1 to Egypt, according to a captured Egyptian general, dates from a visit to Moscow in late 1965 by Egyptian Field Marshal Abdul Hakim Amer. It was planned to equip three brigades with these weapons on PT76 tracked chassis for good mobility.

Some Egyptians have been trained on surface-to-surface missiles and may be able to operate them without difficulty, the Israeli official said. But if they receive the longer-range Luna 2 missiles that had been originally requested, there might be a problem, he said.

Massive Resupply

The Soviets are furnishing the Egyptians with a massive resupply of arms to replace those lost last month (AW&ST June 19, p. 16). "There is an airlift of great proportions going on," the Israeli said. "Hundreds of Soviet transports including Antonov An-12s have been landing in Egypt during the time since the ceasefire." The transports contained a large number of disassembled aircraft —MiG-17s, MiG-19s and MiG-21s, as well as Sukhoi Su-7s, but more advanced types might come later.

A number of aircraft and tanks were shipped from Algeria, he said. This was because the Egyptians needed large quantities which were hard to supply off-the-shelf from Soviet sources. Algeria was ready to give some of its equipment to Egypt on the assumption that the Soviets later will replace it with more advanced hardware.

Soviet ships from Black Sea ports also are moving in great numbers to Egypt with military cargoes. At least part of these shipments are the result of the then-Egyptian minister of war's June 2 trip to Moscow.

Israel is watching the Soviet aircraft and ships making deliveries to Egypt. "We'd really like to have a [Lockheed] U-2 for reconnaissance," the Israeli said.

The Soviet motive is to show the Arab world that it has a friend in need, according to the source. Syria also is benefiting from the Soviet action. Additionally, it is possible that the Soviets thought that the new equipment would satisfy the Egyptian military and safeguard the Nasser regime from a military coup.

Air Force Resurrection

In any event, it will take the Egyptians at least a year to reach the state of military preparedness, they had attained in early June. The Egyptian air force, however, could be quickly resurrected by the aircraft deliveries, since it sustained only about 50 pilot casualties in the war. "There is no problem of manning any planes that they get," the Israeli said.

The Egyptian air force already is operating quite close to the ceasefire line along the Suez Canal, including the three days of shooting incidents beginning July 1. They appeared ready, but made no hostile moves.

The Israeli air force has been watching these ceasefire violations carefully. During the first, units were put on alert, but the air force has not been called into action yet. Undoubtedly, the Israelis wish to keep from escalating the machine gun, mortar and recoilless rifle exchanges to air battles.

The most plausible explanation offered by the Israelis for the ceasefire violations is that the Egyptian leaders wish to show their citizens that the war is continuing in an effort to boost morale in the wake of the military disaster of the six-day war. These incidents probably will continue for weeks and perhaps months, the source said.

In an incident July 4 that may be related to the increased tension along the Israeli-Egyptian ceasefire line, an aircraft believed to have been a MiG-19 was hit by radar-directed anti-aircraft fire after it buzzed an Israeli unit near Ras Sudr on the Gulf of Suez coast of the Sinai Peninsula. The aircraft was credited as probably destroyed, and a second was driven off.

Earlier, there had been several incursions of Syrian troops across the ceasefire line in the Syrian highlands, according to Israeli military spokesmen. These resulted in fire fights, after which the Syrians withdrew.

Syria has called for guerrilla action against Israel, but "the question is whether they have the capability," the Israeli official said. Meanwhile, the Soviet An-12s are delivering weapons for conventional warfare, such as aircraft, guns and anti-aircraft missiles. Ships are bringing in tanks.

Syrian Divisions

According to his appraisal, the Syrians suffered less than the Egyptians in the six-day war, since they kept their best divisions back near Damascus and put inferior troops in the front line. The reason for this, he said, was as much to safeguard the Baathist regime as to safeguard Damascus. The air force, on the other hand, was almost destroyed.

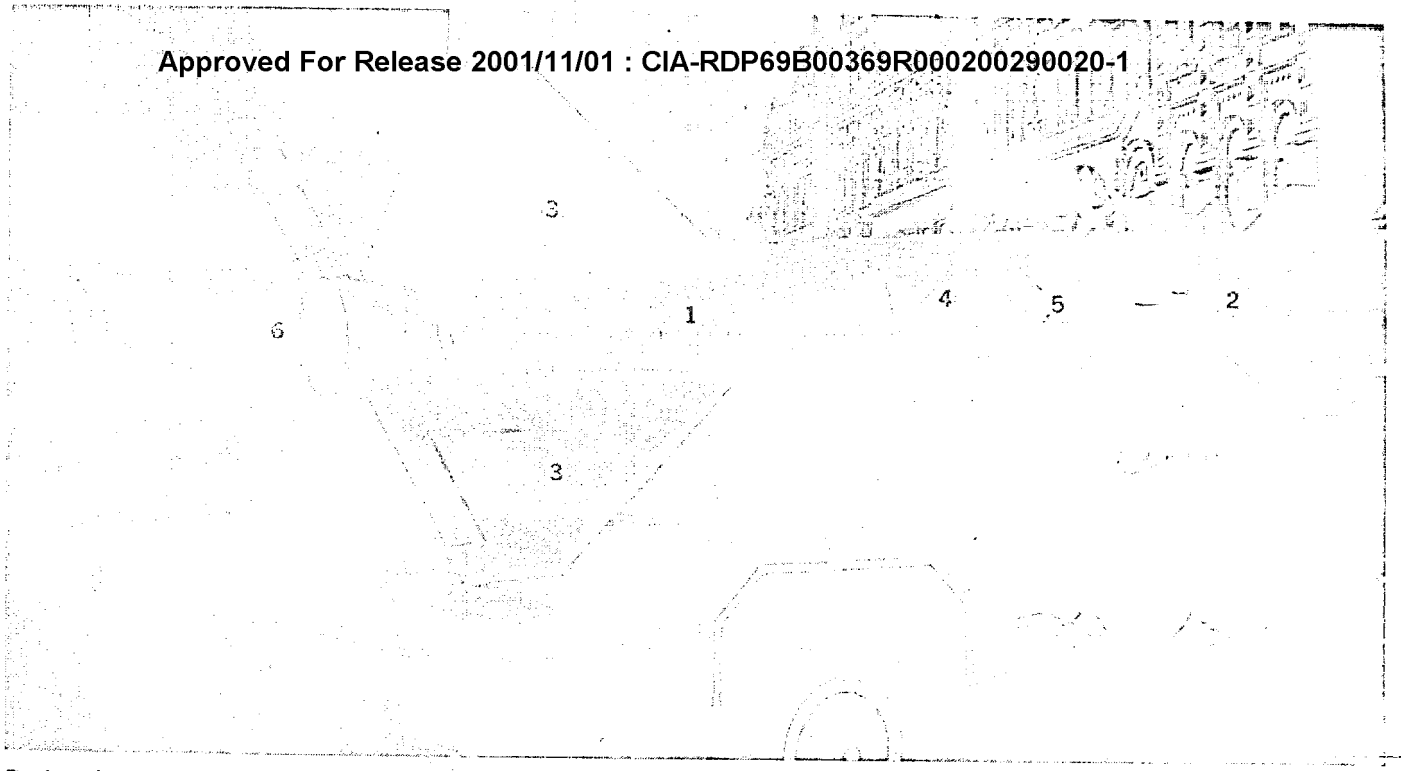
The Soviet Union's motives are still obscure, the source said. The possibility could not be ruled out that Soviet Moslem volunteers might be sent to Egypt and Syria. Soviet or Soviet-bloc pilots also might be sent.

In any event, he said, the Soviet propaganda against Israel is being accelerated, perhaps with the intention of bullying Israel into yielding without war the territory it has occupied. The Soviet newspaper Izvestia has warned that if Israel does not withdraw behind its pre-June 5 borders, there will be a renewal of hostilities.

The Soviets are trying hard to find a reason for the debacle in June, the Israeli official said. They supplied Egypt, Syria and, to a certain extent, Iraq with billions of dollars in hardware as well as the knowledge to use it.

But they were mistaken about Egyptian capabilities, he said. They have already published what they consider to be the main lesson—it was not the failure of Soviet equipment but of Egyptian officers, especially in the air force.

This is false, the Israeli official said. The fault lies in the cultural background of the basic Egyptian soldier, who lacks perseverance and ingenuity, as well as a good example from his officers. On the other hand, he said, the Egyptian soldier is excellent at defense of static positions. He gave a stiff fight on several occasions until overcome by air support and armor."



Design features of the Soviet SA-2 Guideline surface-to-air missile gleaned from undamaged weapons captured by the Israelis include: (1) solid-propellant booster; (2) liquid-fueled sustainer using a combination of nitric acid oxidizer and a hydrocarbon fuel; (3) rear clipped-delta, 37.75-in. fins with movable control surfaces on two of the four surfaces; (4) sustainer skirt; (5) locking arms for sustainer fins, and (6) protective cover for booster nozzle. Diameter of booster casing, the largest segment of the missile body, is 26 in. This photo was taken at the May Day parade in Moscow this year.

West Studies Captured USSR Weapons

Tel Aviv—Soviet equipment captured from Egyptian forces in the Sinai is giving the West its best opportunity for a comprehensive examination and evaluation of modern Russian weapons.

Soviet missiles exhibited at the Israeli army base on the outskirts of Tel Aviv included the SA-2 Guideline surface-to-air missile and the Schmell wire-guided antitank missile, which has the NATO code name Snapper. These have been largely superseded in Soviet service by the newer Guild and Goa rocket-propelled SAMs and the Ganef ramjet-powered long-range SAM. On the antitank side, the Swatter and Sagger missiles have not been deployed to Egypt.

A 122-mm. howitzer displayed is so new, the Israeli army officer in charge of the display said, that it has never been seen in the military parades in the Soviet Union. "It is the latest field gun in Soviet use," Lt. Col. Zvi said.

The SA-2, Zvi said, has the Soviet designation V750VK, while the entire system including the radar van and generators is designated V75SM. It was brought to Israel from the captured site on the road between Suez Town and the Mitla Pass aboard the Soviet Zil 157 semi-trailer transporter which has been seen in Moscow parades. The vehicle was still painted in the Soviet Army's forest green color rather than the Egyption army's sand color.

The Zil 157 has cross-country capability, Zvi said, by virtue of the fact that its tire pressure can be increased or decreased from the cab. The 35.5-ft.-long missile is on a rail on the vehicle's trailer with tiedown clamps fore and aft. It is slid rearward directly onto the launcher rail at the launch site. The launch angle for the SA-2 is about 80 deg. Launch weight is 4,875 lb.

The tandem solid-propellant booster of the missile has a burning time of 4-5 sec. Two of the four clipped-delta fins on the booster are fitted with movable control surfaces, indicating some guidance during boost phase. The fins equipped with these 6 x 20.5-in. surfaces and the two others have a span of 37.75 in., a tip chord of 15 in. and a root chord of 168.75 in. Diameter of the booster casing is about 26 in., giving a total span for the booster stage of about 101.5 in. Exit diameter of the nozzle is 17.5 in. Presence of a plug-in throat prevented measurement of the diameter.

Over-all length of first stage from the forward dome of the motor to the exit plane of the nozzle is 95 in.

After burnout of booster, Zvi said, it is separated from the missile by explosive bolts. The flared skirt is jettisoned, probably by pyrotechnic devices. As it slides rearward, the four small forked arms extending forward from it are pulled away from the cruciform clipped-delta control surfaces at the rear end of the missile, unlocking them.

The liquid-fueled sustainer engine employs nitric acid—probably fuming—and a hydrocarbon fuel, which Zvi called fuel oil. The burning time is 22 sec., during which the missile is accelerated to maximum speed of Mach 3.5, according to Zvi. It is armed in flight by ground command, and detonated either by contact or by proximity fuse, he said, although reports from Vietnam indicate that command detonation of the 288-lb. high-explosive warhead also is used.

Guidance system for the SA-2 is by automatic radio command, according to Zvi, in which the radar tracks the target aircraft. Its output is fed to a computer that generates the steering signals which are transmitted to the missile via a separate antenna.

There are two sets of longitudinal

flush antennas consisting of four strips arranged 90 deg. apart and measuring 22.75 in. long by 1.2 in. wide. One set is in the ogival nose of the missile and the other is somewhat farther back over what appears to be the guidance package. Warhead is aft of the guidance equipment and in same area as the fuel filler, from which an internal pipe leads back to the fuel tank. The oxidizer filler is farther aft near the roots of the cruciform wings of the missile. These fillers and other apertures in the missile, such as umbilical plugs and even bolt holes, were covered with sand-proof adhesive patches.

Diameter of the missile is about 20 in., excluding cable chases leading back to the engine from the guidance package. Dimensions of the fins, all of which are indexed in line, are:

- **Rear control surfaces**—Root chord, 17.75 in.; tip chord, 4.25 in.; span, 11.25 in. Distance from the pivot to the top of the skirt is 23 in.
- **Wings**—Root chord, 70 in.; tip chord, 14 in.; span, 23.5 in. This gives an over-all span for the missile of 67 in.
- **Small nose fins**—Root chord, 8.5 in.; tip chord, 2 in.; span, 4.75 in.

Zvi gave the performance of the SA-2 as a slant range of 25 mi. and a maximum altitude of 60,000 ft.

Sometimes, it appeared that the Egyptians had fired the missile in desperation at Israeli aircraft flying well below the minimum effective altitude of 1,500-3,000 ft. At least a dozen SA-2s were fired, and none are known to have downed Israeli aircraft, although there are reports of one missing under mysterious circumstances that may have been a SAM victim. In one case cited by an experienced Western observer, two SAMs were fired at an Israeli helicopter and exploded above and below it. The blasts nearly inverted the helicopter, but the pilot was able to recover.

Two SAM sites were captured by the Israelis—one between the Suez Canal and Mitla Pass and one near Ras Sudr on the Red Sea coast of Sinai. The latter was unfinished, and it is doubtful that it was operational during the war.

The SAM sites consisted of six missiles in revetted launchers, each with a spare round near at hand. The missiles were situated around the central radar van and generators. Zvi said that all 12 missiles can be fired in 10 to 15 min.

Interestingly, the instructions and labels on the SAM exhibited here were in Russian and English. Zvi said that the Soviets must have assumed that if the Arabs couldn't read Russian they could get along in English.

Stenciled records on the sides of the SAMs indicate the missiles have a long shelf life. These records showed, for example, that the solid booster on one captured SAM had been loaded in July, 1962. Sustainer engine liquid fuel was loaded July 8, 1965, and checked Nov. 21, 1965.

The Snapper antitank missile is the first generation of Soviet wire-guided weapons, and resembles somewhat the Swiss Contraves Mosquito. Apparently, a sizeable quantity of them were captured in Sinai. "We haven't counted them all yet," Zvi said.

Asked whether the captured missiles would be test-fired, Zvi said that "the Israeli army will experiment with everything."

The Snappers were on quadruple numbered rail launchers mounted on the rear deck of a standard Soviet Gaz 69 light utility car. For transport, the launchers would be put in a vertical position by means of a crank and shaft fitted with universal joints and worked by the missile operator from his rearward-facing seat. A baby carriage-type hood which folds down behind the vehicle protects the missiles (AW&ST July 3, p. 25).

Another crank mechanism traverses the launcher left or right.

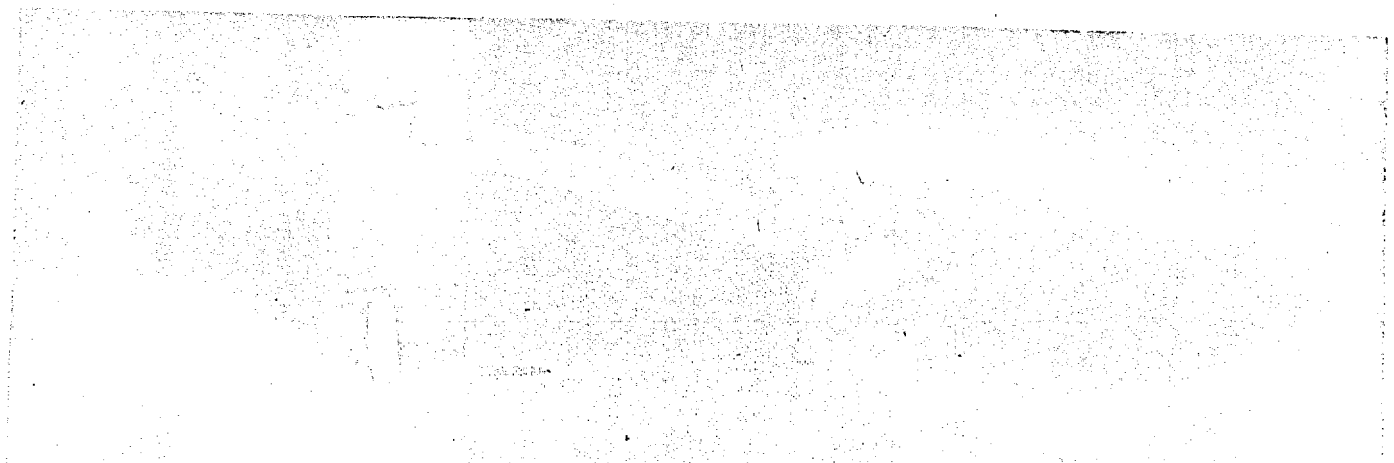
The operator sights the target through a small, high window with periscopic binoculars having an illuminated, variable-brightness reticle for low-light-level operation. The missiles are guided by means of a joystick atop a small console with a firing button, status lights, and a rotary switch for selecting the missile to be fired. The sight and control unit can be dismounted and connected to a 55-yd.-long cable on a reel on the right side of the vehicle for remote firing.

After launch, the operator acquires the two tracking flares on the wings of the roll-stabilized missile at a distance of about 550 to 660 yd., according to Zvi. This corresponds to the minimum effective range. For the last 330 to 440 yd. of its flight, the operator keeps the missile on the line of sight to the target. The maximum range of Snapper is 2,550 yd., and flight speed of the missile is 295 fps.

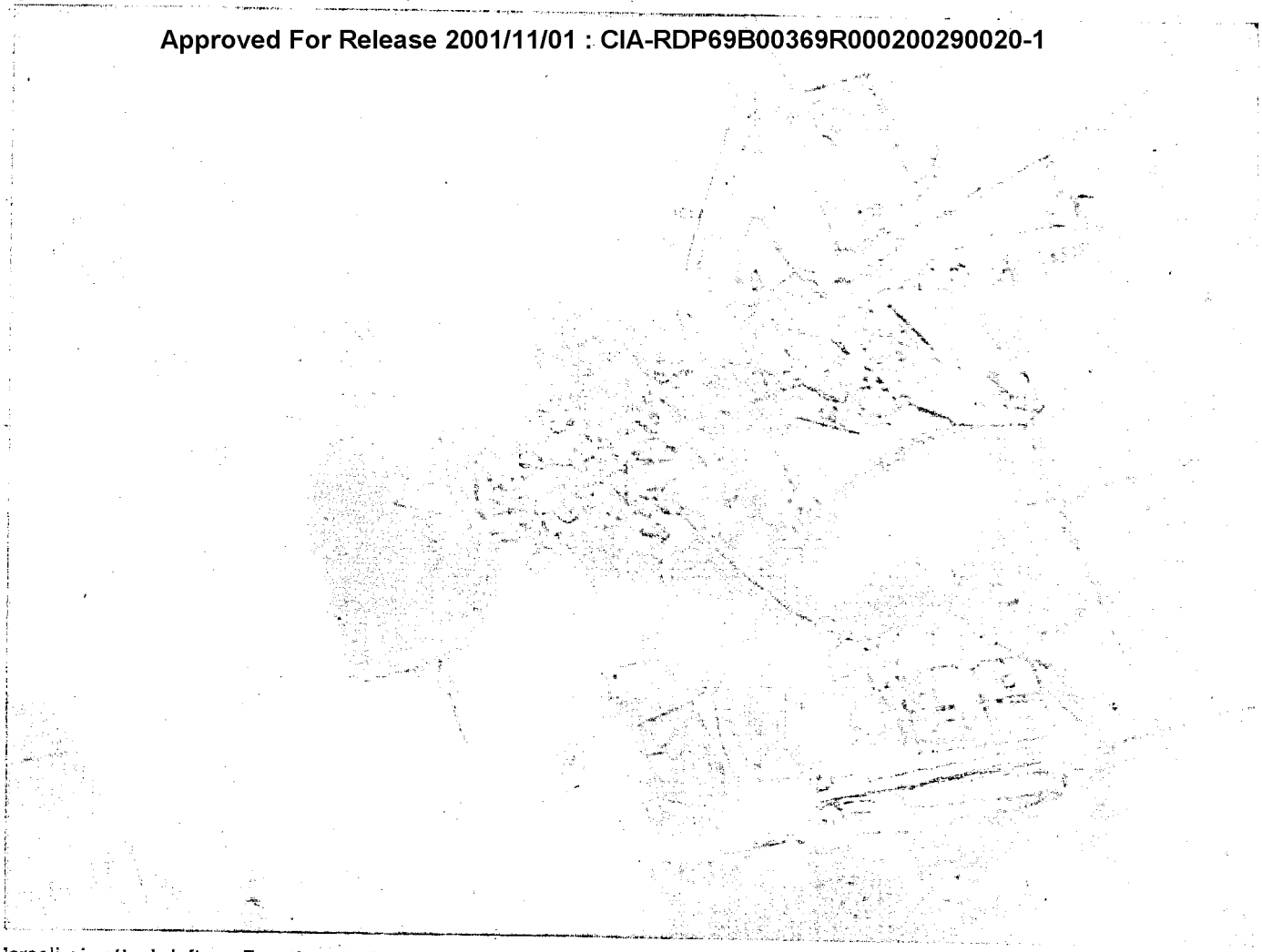
Snapper has a launch weight of 49 lb., of which 11.5 lb. is the detachable hollow-charge warhead. Zvi said this is capable of penetrating armor 13.7 in. thick.

The two guidance wire spools are faired into the body of the missile 180 deg. apart. The launch signal is transmitted via the guidance wires, Zvi said. Screw plugs at the ends of the wires connect with sockets in two right-angle tubular arms on each launch rail.

Snapper has an over-all length of 45 in. from the tip of the fuse to the exhaust plane of the solid-propellant rocket motor nozzle, which has a diameter of about 2.5 in. The nose of the missile is conical and tapers abruptly from the 5.5-in. body diameter to the contact fuse. The latter has a blunt end about 0.5 in. in diameter. All four missiles' fuses had their safety wires inserted.



Egyptian Antonov An-24, apparently undamaged, turns to taxi into a revetment at an unidentified airfield during



Israeli air attack left an Egyptian air force MiG-21 and a ground support vehicle in rubble at an unidentified base.

The four large wings of the Snapper have swept leading edges and straight trailing edges. Root chord is 20 in., tip chord is 8.5 in., and span is 12 in.

Total span of the missile is 29.5 in.

Trailing edges of the wings were fitted with vibrating spoilers in plastic housings.

Spoilers are concave forward and move as a single piece, that is, when they are extended on one side of the wing they are retracted on the other. Span of the spoilers is 4.73 in. Two of the wings were fitted with an additional small spoiler unit outboard of the larger ones; span of these is 2.5 in.

During the war, Zvi said, he knew of four Snappers that were fired at Israeli tanks.

Three missed, but one hit and penetrated.

Other captured equipment on exhibit included:

- Heavy 14.5-mm. anti-aircraft machine gun in single-barreled configuration. Twin- and quad-mounted configurations of the same gun also were captured.

The weapon has a high rate of fire and can penetrate armour of the thickness of that of the U.S. M113 armored personnel carrier.

- Snar-2 field artillery radar mounted on an "ATL" tracked artillery tow vehicle. The unit operates on X-band with about 10 kw. peak power and can detect artillery fire at ranges up to 9,900 yd. It also was used for ground surveillance in both Sinai and the Syrian heights and can detect vehicles at ranges of up to 44,000 yd. It has four scales—40, 10, 5, and 1 km., Zvi said. Snar-2 has a self-contained generator and orange peel-type antenna.
- D-30-type 122-mm. howitzer with an 18,600-yd. range. This advanced weapon has a split-trail tripod that opens out into a turntable affair permitting the piece to be traversed through 360 deg. without moving the base. Rate of fire is 7 rounds/min. Bagged charges are used. The gun was manufactured in 1965. Many tons of ammunition for it were captured, according to Zvi.

Israel Engine Plant

Geneva—Turbomeca, the French engine company, plans to build an engine factory in Israel about 15 mi. west of Jerusalem, and call it Turbomeca-Israel.

The move would enable Israel to build engines for its Potez Fouga-Magisters, manufactured under license by Israeli Aircraft Industries (AW&ST July 3, p. 18), and for its Sud Frelon and Alouette helicopters. It also would give Israel a possible entry into the Anglo-French Jaguar program, since Turbomeca and Rolls-Royce will build the engine.

The agreement by Turbomeca is considered by sources here as a move to circumvent President de Gaulle's ban on arms for Israel.

Israel-Dassault Deal

Geneva—Israel has negotiated an agreement with Avions Marcel Dassault to purchase about 50 Mirage 5s for at least $50 million, without spare parts, it was reported here last week. The Mirages would replace the Israeli Mystere 4 and Ouragan fighter bombers, both produced by Dassault.

It was not known how the reported [illegible] be affected by President de Gaulle's embargo on arms to Israel.